EFFECT OF NUTRITION EDUCATION INTERVENTION PROGRAMME ON KNOWLEDGE, ATTITUDE, AND PRACTICES OF WOMEN SUFFERING FROM CELIAC DISEASE

SHORT SYNOPSIS

Submitted in partial fulfillment of the requirement of the degree of

DOCTOR OF PHILOSOPHY

to

Manav Rachna International Institute of Research and Studies

(Deemed to be University)

by

Saloni Sharma

Registration number: 18/PhD/003

Under the supervision of

Dr. Pratibha Singh

Professor
Faculty of Allied Health Sciences

FACULTY OF ALLIED HEALTH SCIENCES

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

SECTOR-43, SURAJKUND –DELHI ROAD, FARIDABAD – 121001

FACULTY OF ALLIED HEALTH SCIENCES

Certificate

I hereby declare that the short synopsis "**Effect of Nutrition Education Intervention Programme on Knowledge, Attitude, and Practices of Women Suffering from celiac Disease**" being submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in Nutrition and Dietetics under the Faculty of Allied Health Sciences of Manav Rachna International Institute of Research & Studies, Faridabad during the academic year 2018-2019.

It is a bona fide record of original work carried out under the supervision of Dr. Pratibha Singh, Professor, Department of Nutrition and Dietetics, Faculty of Allied Health Sciences and has not been submitted in full or part to any other university or institute for degree or diploma. Further, it is certified that the short synopsis is plagiarism free and proof has been submitted.

Saloni Sharma
(Saloni Sharma)

Registration No. 18/PhD/003

Signature of the Supervisor
Dr. Pratibha Singh
Professor
Department of Nutrition and Dietetics,
FAHS, MRIIRS.

(Chairman, DRC)

(Chairperson, CDP)

ABSTRACT

Celiac disease occurs due to an allergic reaction to gluten a protein present in cereals. In India, it is highly prevalent in the north, northwestern, and central parts of the country. In these areas, the widespread presence of celiac disease is found in approximately 1% of the Indian populace.It is estimated that around 1.5 lakh to 2.0 lakh people are suffering with this disease in Delhi and the NCR area. The aim of the study is to understand and to enhance the nutritional, physical, social, and psychological wellness of women (age group between 18 to 39 years) who are suffering from celiac disease using a nutrition education program. 138 females suffering from celiac disease in the age group ranging from 18 to 39 years will be selected from the gastro/endocrinological clinics and hospitals situated in Delhi-NCR. The women suffering with celiac disease will be screening based on the tests of anti-tissue transglutaminase Antibody. Anthropometry, dietary patterns, and biochemical markers such as Haemoglobin (Hb) level, vitamin D, vitamin B12, and calcium will be taken. In the presence of other autoimmune diseases with celiac disease such as diabetes and thyroid, HbA1c and TSH will be assessed using standardized methods. Knowledge, Attitude, and Practices of participants will be assessed. Nutrition Education Intervention Programme for 3 months once a week will be conducted to educate and enhance Knowledge, Attitude, and Practices towards disease management of women with celiac disease to maintain their nutritional status and overall well-being. Different modules, diet plans, and audio-visual tools will be used to educate and create awareness among the participants regarding disease management. The effectiveness of this program will be assessed by pre to post Knowledge, Attitude, Practices, and Nutritional status of participants. The quantitative and qualitative data will be analyzed using appropriate statistical methods and tools.

Key Words: Celiac Disease, Gluten, Endocrinology, Nutritional Education Intervention Programme, Information Education and Communication Material, Nutritional and Health Status, Audio-Visual Aids, Modules.

CONTENTS

S. No	Description	Page No.
1.	**Introduction**	5-11
	1.1 Definition	
	1.2 What is gluten?	
	1.3 Prevalence of Celiac Disease	
	1.4 Risk factors	
	1.5 Clinical Manifestation of Celiac Disease	
	1.6 Diagnosis	
	1.7 Manifestation of Celiac Disease in male/female	
	1.8 Women-related problems	
	1.9 The treatment of Celiac Disease	
	1.10 The effect of education on the knowledge, attitude, and practices of patients with celiac disease	
2.	**Literature Review (Harvard Style/ APA/MLA citation)**	12-17
3.	**Description of Broad Area**	18-19
4.	**Objectives of the Study**	20
5.	**Methodology**	20-24
6.	**Expected Outcome of the Research**	24
	References (Harvard Style/APA/MLA)	25-32
	Plagiarism Report	

1.INTRODUCTION

1.1 DEFINITION

"Celiac" disease is contrasted due to an allergic response to gluten, a protein present in cereals such as wheat, barley, and rye. While wheat is the primary cereal with gluten, the disease is also commonly identified as wheat allergy (Narayan et al., 2014). Celiac disease is a long-lasting susceptibility to gluten (Hill et al., 2005). "It is manifested as a systemic autoimmune disorder characterized by mucosal damage in the small intestine following ingestion of gluten" (Buzy, 2010).

1.2 WHAT IS GLUTEN?

The proximal part of human small intestine is indigestible for gluten protein which is supplemented with glutamine and proline. The 'gluten' is the protein that is the whole component of wheat: gliadin which is an alcohol-dissolvable segment of gluten, which has lots of toxic components. A peptide, a non-digestible molecule of gliadin consisting of 33 amino acids remains in the intestinal lumen after gluten consumption as it is not decomposable by the action of gastric pancreatic and intestinal brush-border membrane and proteases in the intestine of a human being. When intestinal permeability and infection increase in the human intestine, this peptide reacts with antigen-presenting cells in the lamina propria on passing through the epithelial barrier of the intestine (Green and Cellies, 2007).

In genetically susceptible individuals, ingested gluten sets up an autoimmune reaction to an antigen known as transglutaminase present in the intestinal mucosal cells. Due to the autoimmune reaction, antibodies to these antigens (anti-tTG IgA &IgG) are produced in the body. The interaction between these antigens and antibodies progressively weakens the small intestinal mucosa. This small intestinal mucosal illness is the main sign of this disease. That is why the disease is also called "Gluten enteropathy." Previously the enteropathy (intestinal mucosal damage) is expressed, and the diagnosis of celiac disease is confirmed, there is only one distinct treatment of this disease, and that is total lifetime avoidance of gluten from the diet.

1.3 PREVALENCE OF CELIAC DISEASE

Particularly in India, it is profoundly prevailing in the North, North Western, and Central part of the country. In these regions, the widespread presence of celiac disease is approximately to affect 1% of the inhabitants. It indicates that it is at least 4 times more frequent than a well-known disease known as AIDS! It is estimated that there may be around 1.5 Lacks to 2.0 Lacks people suffering from with this disease, particularly in Delhi and NCT areas (Narayan et al., 2014). In the United States, Celiac disease has been considered a rare disease. It is estimated that 0.5% to 1% of the U.S population is suffering from celiac disease (NIHS, 2004).

Including the elderly populace, celiac disease may arise at any age (Collin et al., 2018). Such identification does not necessarily show findings of establishing celiac disease or gluten intolerance in adulthood (Catassi et al., 2010). However, in present days most of the studies reported that celiac disease is diagnosed in many patients at the age of childhood (Liu et al., 2017 & Andren et al., 2019).The incidences of celiac disease are less prevalent in males as compared to females (King et al., 2020). In a screening study, high sero-positivity was reported among female patients in their meta-analysis and systematic review (Jansson-Knodell et al., 2019). Although some research studies conducted on young patients found that males and females have almost the same sero-prevalence (Rubio-Tapia et al., 2009 & Katz et al., 2011**).** While doing upper endoscopy, males are unlikely to experience duodenal biopsy investigation. Two conditions such as diarrhea and reduce weight might contribute to under diagnosis (Lebwohl et al., 2020).

1.4 RISK FACTORS

Celiac disease is not the infection itself, but the tendency to accentuate the disease which is inherited. By and large (> 95%), the disease occurs only in those individuals who have either DQ2 or DQ 8 HLA antigen present in them. Our inheritance determines the proximity of this specific antigen. Around 30 percent population has either HLA antigen present, but the disease occurs only in 3 percent of the individual who carries either of these antigens. The extent of the disease is increased by 10-fold (10-12%) among siblings and close family members of an affected individual, owing to the inherited nature of the disease (Narayan et al., 2014).On the other hand, two survey studies indicate the existence of environmental risk factors among monozygotic twins by 49% to 83% (Nistico et al., 2006 & Kuja-Halkola et al., 2017). In present years, the seroprevalence of celiac disease has also been steeply higher in several

countries.In1950 the Warren Air Base collected serum samples from same-age group patients with celiac diseases in 2006 and reported 0.2% to 0.9% growth in the serology of celiac disease (Rubio-Tapia et al., 2009). A survey study was conducted in Finland which unraveled the increasingly widespread of celiac disease. A higher rate of celiac disease has been reported from 1.05% (1978) to 1.99% (2000) (Lohi et al., 2007). This higher elevation in the widespread of celiac disease would be because of environmental risk factors instead of genetic risk factors.

1.5 CELIAC DISEASE : CLINICAL MANIFESTATION

Celiac disease is considered a disease of the proximal part of the small intestine but in some individuals, it covers the whole intestine. Due to the proximal location in the small intestine, it causes malabsorption of nutrients such as iron, folic acid, calcium, etc (Green & jabri, 2003). The symptoms of celiac disease can vary from asymptomatic to severe malabsorption of nutrients. Clinical subtypes of celiac disease are:

- **Symptomatic or classic** : refers to the presence of the classical characteristics of celiac disease which include long-term diarrhea, abdominal pain, bloating, fatigue, deficiencies of certain nutrients, and malabsorption.
- **Atypical** : in which gastrointestinal symptoms may or may not be present but extra-intestinal symptoms such as iron deficiency anemia, osteoporosis or bone loss, infertility or impotence and neurological disorder are commonly noticeable (Branski and Troncone, 1998).
- **Asymptomatic or silent :** absence of classic or atypical features but may have villous atrophy that may be diagnosed through endoscopy or intestinal biopsy for another reason or as a result of serologic investigation (Alaedini and Green, 2005).
- **Latent :** mostly found in those patients who are IgA anti-endomysial antibody positive, but with normal or minimally abnormal small bowel biopsy (Dewar and ciclitira, 2005).

1.6 DIAGNOSIS

- **Serological test:** is a significant tool to diagnose celiac disease (Cranney et al., 2005). Assays for anti-gliadin antibodies have not been suggested for the past 10 years due to their lesser effectiveness in contrast to other diagnostic tools (Harewood & Murray 2001).“The discovery that TTG is the target of IgA endomysial antibodies (EMA) was

key to the development of modern serologic tests for celiac disease" (Dieterich et al., 1997).

- **Genetic testing:** Polymorphisms in HLA-DQB1 and HLA-DQA1 increase the risk for celiac disease (Brown et al., 2019 & Lundin et al., 1994). "Genetic tests can be helpful for the assessment of patients on a gluten-free diet who were not tested for celiac disease before they started the diet, for patients with discrepant results from serology or histology analysis, and for patients with suspected refractory celiac disease for whom a diagnosis of celiac disease remains in question. Although the risk is highest in persons homozygous for the DQ2 haplotype and lowest in persons heterozygous for the DQ8 haplotype, this genetic information is less useful in clinical practice, as most patients do not develop the celiac disease even if they are prone to the highest risk genetic category" (Liu et al., 2014).
- **Duodenal Biopsies:** Deformities found in upper endoscopy such as scalloped folds and fissuring in the duodenum do not confirm the presence of celiac disease (Shah et al., 2000).So,for the diagnostic confirmation of celiac disease intestinal biopsy analysis is required (Guandalini et al., 1989).

1.7 MANIFESTATION OF CELIAC DISEASE IN MALE/ FEMALES

In a survey conducted by Bai et al. (2005) one can say that celiac disease is more prevalent and common in females as compared to males. Severe malabsorption of nutrients and shorten the duration of sickness were found in males before the diagnosis of celiac disease. Diagnostic age, presentation mode, the pervasiveness of gastrointestinal symptoms, and genetic history of celiac disease have no influence on gender differences. As considered by the negative Z scores, this study demonstrated that both males and females with celiac disease had less BMI than age and equal sexuality populace. So that males and females both are almost equal Z scores. The minute differences were adhered to physiological only, not because of celiac disorder. In an "Italian study, (Ciacci et al., 1995) revealed that females were diagnosed at an earlier age and experienced iron deficiency anemia, underweight, and malnourishment. However, Z scores were not considered in this study.

"Celiac disease represents a model of food-dependent autoimmunity in which patients frequently have other autoimmune diseases"(Ventura 1999, Cooper 1978 & Sategna et al., 2001)**.**Celiac disease is usually occurring in females with a male-to-female ratio of 1:2 or

1:3whereas autoimmune diseases in contrast to celiac disease have a male-to-female ratio of 1:2.7 (Jacobson, 1997).Males had an equal tendency to develop the autoimmune disease as females, so gender differences had become meaningless in celiac disease. It shows that male who is suffering from celiac disease is at higher risk of developing the autoimmune disease as compared to a male who does not have celiac disease. The main cause remains ambiguous. In a research survey conducted by Bai et al. (2005) found that malabsorption and shorter duration of symptoms in males with celiac disease were revealed due to their lower total serum cholesterol and weaker bone density. They established gender differences in celiac disease patients. The autoimmune disease and iron deficiency anemia can originate in males at the same pace and severity as in females. The main cause still remains vague, but it may be due to the hormone imbalance that takes place in males with celiac disease (Farthing & Rees, 1983). It is clear that celiac disease is a female prevalent disease, in spite of the fact; the male had serious expressions of this disease as compared to women.

1.8 WOMEN RELATED PROBLEMS

Women suffering from celiac disease experience some other problems:

- Lethargy/fatigue
- Amenorrhea
- Infrequent menstruation
- Menopause at early age
- Spontaneous abortion
- C-section delivery
- Unexplained infertility
- Anaemia due to iron deficiency
- Osteoporosis and Bone loss/fracture
- Shorter period of breastfeeding

1.9 THE TREATMENT OF CELIAC DISEASE

Lifelong adherence to a strict gluten-free diet devoid of proteins from wheat, rye, barley, and related cereals is the only treatment for the celiac disorder. A big challenge for patients suffering from celiac disease is to follow a strict gluten-free diet, which is a common component in the human diet. As contrasted to gluten-containing products, gluten-free products are less accessible, more expensive, and contain less nutritional value. Dietary compliances are unacceptable in a large number of patients. Moreover, a number of asymptomatic celiac disease patients on GFD (gluten-free diet), test negative but serology shows chronic intestinal damage, even if compliance is not a problem (Catassi et al., 2007 & Lanzini et al., 2007). This chronic intestinal damage may be because of insufficient knowledge and information on safe gluten thresholds or gluten cross-contamination.

"Celiac" disease is often identified in our country. Adequate public awareness and limited availability of diagnostic facilities often lead to considerable delays in diagnosis. Families and patients often find it difficult to accept the diagnosis or the need for life-long adherence to a gluten-free diet. In North India, where wheat grain is a core ingredient of a regular diet, to even considering a meal without mixing some wheat and wheat products like atta, maida or suji is inconceivable for some (Narayan et al., 2014).

Therefore, being diagnosed with celiac disease can be a considerable challenge that requires both emotional and physical adjustment for the entire family. The patient begins feeling very alienated from the people because the patient cannot fully participate in the daily routine of the family meal get-together.

Several nations in the world experience the benefits of a wide range of suitably certified gluten-free foods like biscuits, pastries, bread, and distinct products that are conveniently available to. In our country, gluten-free products are still not feasible mainly because the concerned governments have failed to lay down standards for labeling food as gluten-free. The families in our country have to struggle with cumbersome recipes of homemade foods to ensure a nutritionally wholesome, palatable diet for the affected individuals while children remain deprived of all the 'goodies.'

1.10 EFFECT OF EDUCATION PROGRAMME ON THE KNOWLEDGE, ATTITUDE, AND PRACTICES OF PATIENTS WITH CELIAC DISEASE.

Methods to improve patient knowledge about the disease include patient education events (Nasrabadi, 2010). Patient's behavior and attitude may be changed with the help of educational programme with other educational resources and help them getting rid of the problems associated with the disease (Anderson, 2005).Without a logical and planned approach Traditional patient education programs will notbe successful and effective getting changed in the patient's behaviors (Izadirad, 2014). People belong to local community may also get benefit of changing their own knowledge, behavior and attitude towards the disease management through patient education programme(Little, 2016).

There are many diseases among people in the community that put a significant strain on healthcare resources. At the same time, In order to fulfill the educational needs of the patients the heath care system should take care of the general health of the society and provide essential health services to them. The knowledge and training provided by educational progmamme to the patient and their family may help to improve their quality of life.

Patients of celiac disease often complain about not being well acquainted with the diagnosis, treatment and management of the disease (Nejad, 2011). Recently diagnosed patients with celiac disease due to lack of support may get non-adherence to gluten free diet unknowingly which lead to adverse health effects including development of some heath issues such as such as enteropathy-associated T-cell lymphoma (EATL) (Ehsani-Ardakani, 2013).In addition, due to non aquaintine of the disease, symptomatic patients may remain undetected diagnosed despite the presence of specific diagnostic tests.

Therefore, there is a need to develop an education programme with different information education and communication material for patients to improve their knowledge, attitude, and practice regarding the diagnosis, treatment, and management of celiac disease.

2. LITERATURE REVIEW

Manzanares and Lucendo (2011) stated that Celiac Disease (CD) is a gastrointestinal disorder activated and retain by the intake of gluten-containing foods. There is a noticeable delay in the diagnosis of celiac disease in young patients especially in adults, as they have milder symptoms and recurrent negative serology tests. Celiac disease leads to abrasion in the intestine which instigates various deficiencies of nutrients like vitamin B12, folic acid, fat-soluble vitamins, and dietary minerals. The deficiencies associated with lactose intolerance, cause osteoporosis and a higher risk of fractures. Furthermore, deficiencies of nutrients need proper treatment. Treating celiac disease patients with a gluten-free diet has become a complicated process. In most countries around 70% of industrial food products are made up of gluten and are not standardized. This study gives a deep understanding of the nutritional aspect of celiac disease and provides remedial measures to cure the deficiencies in order to ensure optimal GFD nourishment.

Jacobsson et al. (2012) concluded that, although a large percentage of gastrointestinal symptoms were documented in Swedish women with celiac disease despite having GFD than women without the disease. This survey depicted the efficacy of education intervention in females with gastrointestinal disturbance or symptoms who were adhering to a gluten-free diet. Gastrointestinal symptoms were observed during and after the intervention and evaluated by using Gastrointestinal Symptoms Rating scales. The intervention group reported improvement in gastrointestinal symptoms after ten weeks of Intervention education that remain six months later whereas the control group reported no improvements. It is demonstrated that there was no remarkable difference between the two groups from the baseline to 10 weeks but showed improvement in the index revealing stomachache.

Sainsbury, Mullan & Sharpe (2013) stated that to cure gluten-free diet adherence in adults with celiac disease, the efficacy of an interactive online intervention has been recommended. The intervention group and control group were engaged in a randomized controlled trial. After online education intervention, records were present for intervention as well as wait-list respondents. The first end result was based on the patient's gluten-free diet adherence and the second end result was the patient's knowledge about gluten free diet, the standard of living, and psychosomatic symptoms. The results of this survey study revealed that in contrast to the control group, the intervention group showed significant improvement in patients' adherence

and knowledge of gluten-free diets. The alteration in knowledge did not give effective results toward the change within dietary adherence. These enhancements were continued at a 3-month follow-up schedule. It was concluded that the online curriculum was a successful and hopeful resource for celiac patients to enhance gluten-free dietary adherence.

Sainsbery, Mullan & Sharpe (2014) conducted an online theory-based intervention study on achievability and palatability among celiac disease patients to enhance strict gluten-free diet adherence. The purpose of this intervention program was to overcome the weakening and enhance the acceptability of gluten-free foods among celiac patients as well as assess the success and efficacy of the programme. They found a relationship between the existence of psychological symptoms, use of adaptive coping strategies, duration of a gluten-free diet, and change in attitude with achievability and palatability ratings. They concluded that some changes in the structure and execution of the intervention may prove helpful in reducing the weakening and enhancing the efficacy to spread information about disease management in a large number of the CD population.

Assor et al. (2015) investigated that in spite of having a greater risk of CD in type-1 diabetic patients**;** they planned an educational CD diet study regarding GFD for youngsters and adults who are suffering from celiac disease and type-1 diabetes. The main objective of this randomized control research was to examine the safety and efficacy of GFD in patients with asymptomatic CD and TID. Explanation and assessment of diet intake pattern, glycemic index, and glycemic load as well as novel evaluation of gluten gradation, objective and subjective measures of GFD adherences were the important diet element of this study. They stated that this evaluation will help to assess adherence and will also be unable to evaluate the effect of GFD on metabolic control, bone health, and QOL in patients with CD and TDI.

Farid et al. (2015) reported that Celiac Disease occurs at five to ten folds greater occurrence in patients with type 1 DM. Insufficient data is available for benefit of GFD to control diabetes, and improve bone health/density and standard of living in the large number of diabetic patients having celiac disease without the symptoms."The Celiac Disease and Diabetes-Dietary Intervention and Evaluation Trial (CD-DIET)" study was done to assess the effectiveness and safety of gluten-free diet in diabetic patients with asymptomatic celiac disease. The first end result assessed the effect of the gluten-free dietary adherences on change in the level of HBA1C whereas the second end result assessed the change in bone mineral density and blood glucose variability as well as QOL among patients who followed a gluten-

free diet and the regular diet group for a period of one year. This study depicted the effectiveness of GFD to control HBA1C as well as complexities in asymptomatic celiac disease in youngsters and adult's patients with type 1 DM (Diabetic Mellitus)

Haas, Martin & Park (2017) conducted the studyto assess the impact of "Text Message Educational Automated Compliance"**.** Studyenrolled 61 celiac disease patients' age group between 12 to 24 years for a period of one year.In this study intervention group was comprised of 45 distinctive text messages where as the control group acquired the standard of care treatment.Objective markers of primary end results for adherence to gluten free diet having serum tissue transglutaminase IgA and delamidated gliadin peptide IgA levels.Secondary end results were gathered from patients through the web or online based study**.** The study showed that there was a significant enhancement with respect to scores obtained from enrollment with 3 months follow-up scores in quality of life and patient activation. On the other hand, no statistical difference was seen in the patient's objectively assessed gluten free diet adherence.They found that TEACH was an effective intervention for celiac disease patients in improving their total well being and also among the group adherence to gluten free diet at baseline.

Barzegar et al. (2017) they investigated the impact of education on patient's knowledge about celiac disease in Iran. During the study session, patients were provided the study material comprised of information regarding diagnostic methods, prevalence and therapies involved in the celiac disease. Each patient filled out a celiac disease questionnaire before and after the educational session. The results of education programme showed that patient's knowledge about the disease consequence, and management was significantly improved. Increasing patient knowledge can help to improved patient overall health.

Muhammad, Reeves & Jeanes (2019) reported that Perfect knowledge, correct motivation, and modified behaviors are required in order to adhere to a GFD which can be challenging as well. Researchers reported from six intensive studies that 45 to 90 % of celiac patients of different ethnicity were adhering to GFD. Gluten-free diet adherence can influence by stress, age at diagnosis, after effect of gluten consumption, nutritional consultation as well as knowledge about availability, food labels, price of gluten-free products, and celiac society group. To date, five intervention studies in adults suffering from celiac disease, including dietary and psychological counseling use of different apps, text messages, telephonic clinics, and online training programs were observed to enhance gluten-free dietary adherence. The

convenience of the patient is predominant along with the cost-effectiveness for the healthcare environment; and also, the future intervention should be included with people of all ethnicity.

Dowd et al. (2019) stated that in order to obtain well-being and avoid adverse short- or long-term health problems, patients with celiac disease must obey a strict gluten-free diet regime. Unluckily, terrible qualities of life (QOL) and up to 30% of negative gastrointestinal symptoms were found in celiac disease patients with strict GFD. This entire programme assess the pre and post intervention follow up 3 month periods and also provided education to the patients regarding advancement in gluten free foods, psychosocial, social coping and self regulatory skills as well as sleep hygiene. After the accomplishment of the final assessment, WLC participants were offered 12 weeks of HIIT program + online lifestyle study sessions. The evaluation of quality of life and gut micro biota composition at the end, of the primary stage was done. In the second stage all symptoms regarding gut metabolism, gastrointestinal and other parameters such as quality of sleep, adherence to gluten free diet, exercise behavior, self composition, and self regulatory efficacy were assessed. They found this interventional study was able to enhance the knowledge of patients suffering from celiac disease with respect to the effects of HIIT and lifestyle education.

Wolf et al. (2019) conducted an education intervention programme based on cooking including homemade cooked foods with natural gluten free ingredients which consist of 4 to 5 hours of classes to implement social cognitive and social determination theory to enhance gluten-free dietary adherence, improve symptoms and total wellbeing of patients with celiac disease. For the study, they appointed "80 teenagers and young adults suffering from celiac disease, half of them suggested cooking food at home with natural ingredients. In 12 patients at the baseline, the researcher assessed the celiac disease-specific quality of life, symptoms, dietary adherence, depression, stress and anxiety by using validated measures. Researchers found that this intervention was helpful for enhancing patient motivation, increasing gluten-free dietary adherence, and the total wellness of patients with celiac disease.

Lasa (2019) represents the new GFD evaluation software as an e-health tool for gluten-free diet assessment and enhancing the total well-being of CD or gluten-sensitivity patients. This software retains a high number of gluten-free rendered foodstuffs and their nutrient content. The software represents an important tool for nutritional education and design, planning, assessment, and appropriateness of the gluten-free diet, evaluating a gluten-free diet with

gluten-free products instead of with their gluten-rich counter-part, and also supports maintaining personal care for CD patients. In addition to this, data from anthropometric and biochemical measurements, the presence of symptoms as well as dietary compliances can be recorded and assessed. On mobile and tablets, an open free software app can be downloaded. **Muhammad et al. (2020)** stated that celiac disease (CD) can only be treated with a gluten-free (GF) diet, and non-adherence to the diet is linked to increased morbidity.The goal of the study was to assess the impact of Telephone clinic which were created to improve about celiac disease patient's understanding and adherence to the gluten free diet. Patients, who did not follow a gluten free diet, participated in a customised telephonic clinic. Survey was done to adherence a gluten free diet, awareness about gluten free foods products, improvement in quality of life related to celiac disease. GF dietary adherence (CDAT) median scores was significantly increased compared to baseline after 3 to 6 months establishing the telephonic clinic. The dietary load quality of life score remained consolingly close from baseline values. The control group's CDAT scores remained unchanged. Improved GF dietary adherence (CDAT) score was correlated with a change in GF dietary knowledge score. The CDAT scores were comparable to baseline values at 9 and 12 months. It was concluded that, in individuals with CD, telephone clinics have a good effect on nutritional awareness and GF diet adherence, encouraging health-beneficial behaviours in those who had not previously followed a GF diet. The study emphasises the importance of routine patient follow-up, with focused reviews for patients who don't follow a GF diet.

Namvar et al. (2022) investigated the impact of a group-based education program on gastrointestinal symptoms and quality of life in patients with celiac disease**.** In their study they did three months randomized trial on 130 celiac disease patients who had been following gluten free diet and divided them into intervention and control group. They provided group based education or regular education to the intervention group. After three months period of intervention, they evaluated gastrointestinal symptoms and quality of life using a gastrointestinal symptoms rating scale (GSRS) and SF-36 questionnaire. The baseline levels did not significantly differ between the two groups. The average number of GSRS score in the intervention group was significantly lower than of the control group after the period of three months of intervention, according to the results. Additionally, three months after the intervention, there was a significant difference between the two groups mean SF-36 scores. Results demonstrated group-based education was a successful intervention for celiac patients to reduce gastrointestinal symptoms and enhance their quality of life.

Jyoti, Sangwan & Rani (2022) investigated the effect of Nutrition Interventions on Knowledge and Adoption Feasibility of Gluten Free Products by Celiac Disease Patients. The goal of this study was to help celiac disease sufferers become more technical and knowledgeable about diet. This study supported nutrition education to celiac disease patients and provides them with training on how to prepare gluten-free foods. The snowball method was used to pick at random 30 celiac disease patients. Lectures and cooking demonstration were given to celiac disease patients to prepare quinoa based products such as ladoo/ upma/ porridge. The nutritious value of quinoa products was explained in leaflets that were distributed. Pre-exposure ratings showed that respondents knew very little about gluten-free meals quinoa based products and their price, nutritional value and the medicinal benefits of quinoa seeds as well. After receiving nutrition education, respondent's knowledge ratings scores significantly increased. They like all the quinoa dishes, including laddoo, porridge, pulao, and upma, and thought they could easily recreate them.

3. DESCRIPTION OF BROAD AREA

Celiac disease is a life-long disorder that can cause several autoimmune disorders as well as micronutrient deficiencies which can affect a woman's well-being. Women with celiac disease need special care and treatment, especially in pregnancy, lactation, pre-menopausal, peri-menopausal, and post-menopausal phases of their life. Women due to the immense social responsibility put on them often lack in taking proper care of themselves resulting is a weakening of their physical, mental, and social health. Diet plays an important role in a person's life; it may become a friend or may end up being an enemy. For women with celiac disease, become very crucial to provided with a well-balanced diet in order to maintain their health. For the past 10 years, nutritionally dense gluten-free food with sufficient nutrition has also declined.

Gluten-free food available in the markets these days is costlier than its gluten-rich variants. It also has a lower amount of protein, and fiber, and a higher amount of fats, especially saturated fats in contrast to its gluten-rich variants. Fortification of gluten-free foods with various micro and macro nutrients will be a great initiative to combat nutritional deficiencies in women with celiac disease. The problem becomes more complex when the patient is not aware and well-educated about the cure and management of the disease. So given them, a diet plan rather patients will be educated to manage their problem by themselves, which is possible to make them aware of the possibilities of substitutes available for wheat. It has been challenging for doctors, dieticians, and other healthcare professionals to educate and provide knowledge to women with celiac disease about their health and nutritional status.

In order to combat these issues, a well-designed 'Nutrition Education Intervention programme' will be conducted with the help of Information Education and Communication Material for women with celiac disease above the age of 18 and under the age of 39. This programme will be helpful in educating women on how to maintain a healthy weight, and nutritional status, and improve their gastrointestinal symptoms, while also enhancing their knowledge, attitude, and practices toward their disease management. This study will include a one-hour group session every Sunday for 3 months. Each session will talk about a different aspect of their disease and help them manage it. Face-to-face direct communication will also be done among the subjects in a classroom setting.

The first session will discuss the general problems and issues faced by women suffering from celiac disease. Modules provided in the sessions will include a detailed discussion on symptoms, diagnosis treatment, and management of the disease. There will be one session that will discuss the availability, cost labeling nutritional value, and standardization of different gluten-free foods in the market of Delhi NCR. One session will be conducted to evaluate the knowledge, attitude, and practices of the subjects suffering from celiac disease.

There will also be a session discussing gluten-free diet plans which will inform the subjects on cost-effective nutritionally balanced and easy-to-maintain diets and a session discussing how to enhance the social, physical, and psychological well-being of the subjects. One final session will be conducted to assess the health of the subjects by taking anthropometric and biochemical measurements. The effectiveness of this program will be evaluated by questionnaires.

Aim: To Assess the Effect of Nutrition Education Intervention Programme on the Knowledge, Attitude, and Practices of Women Suffering from celiac Disease

4. OBJECTIVES

1. To assess the clinical symptoms and nutritional status of women suffering from celiac disease.
2. To assess the Knowledge, Attitude, and Practices regarding dietary habits and disease management among women with celiac disease.
3. To develop Information Education and Communication Material for the Nutrition Education Intervention Programme for selected participants.
4. To evaluate the efficacy of the program by comparing pre and post Knowledge, Attitude, Practices, and nutritional status of selected participants.

5. METHODOLOGY

The present study will be undertaken to assess the effect of the Nutrition Education Intervention Programme to improve Knowledge, Attitude, and Practices as well as to enhance the overall well-being of women suffering from celiac disease with effective Information Education and Communication Material. In this research study, a dietary survey, and anthropometric and biochemical measurements will be taken to assess the clinical symptoms and nutritional status of women with celiac disease. After completing the program, its impact will be thoroughly assessed. The material and methods will have been discussed under the following headings.

- Research design
- Locale of the study
- Sampling and design of the study
- Selection of sample
- The method used for the survey
- Formation of the questionnaire
- Collection of data
- Calculation of food and nutrients intake
- Statistical tools used for the analysis of data

Research Design: Interventional Study with pre-test and post-test.

Locale of the study : The present study will be carried out on women diagnosed with celiac disease and followed different clinics and hospitals of gastro/endocrinologists OPD and IPD located in Delhi NCR.

Study Sample: females (18 to 39 years) diagnosed with celiac disease.

Sample Size: 138 subjects from different Hospitals/ OPD / households/clinic setups based on alpha =0.05, and p=0.1 have been calculated as per the formula by (Danial 1999 (p192); Makharia et al., 2011).

Sampling Technique: Purposive Sampling

Inclusion criteria

- Female having celiac disease between 18 to 39 years of age.
- Females with celiac disease with other medical conditions like thyroid and diabetes.
- Female with celiac disease from all socio-economic strata.

Exclusion criteria

- Children and males are not included in this study.
- Females below 18 years and above 40 years.

Methods and Tools used for Research: An appropriate open-ended and structured questionnaire, as well as an interview method, will be used to identify the clinical symptoms, Knowledge, Attitude, Practice as well as nutritional status of women with celiac disease toward the disease management. It is an appropriate method for acquiring the necessary information. While framing the questionnaire it will be kept in mind that the questionnaire will be short and simple to understand the respondents. The purpose of the questionnaire will be to provide a standard tool for observation. The questionnaire will be designed as a memory tickler that would facilitate the work of tabulation and analysis. Different tools for research will be face-to-face communication in classroom teaching, social media, and online teaching using ppts, booklets, or modules (English and Hindi) will be developed and used as effective communication material. The study will be conducted in total three phases:

Phase I: (Pre-Intervention phase) in this phase, the data of general information/ health profile/clinical profile (anthropometric and biochemical measurements) of patients will be taken. Information about diet and disease management related Knowledge, Attitude and Practices will be taken.

Anthropometric Measurement

Height: A stadiometer will be used to measure height**.**

Weight: Digital weighing scale will be used to check the weight of the subjects**.**

Medical Examination: It will include medical history review, blood tests (HbA1c, Thyroid profile, haemoglobin, vitamin B12, Calcium, vitamin D) and blood pressure measurements of each subject and it will be done by a registered Dietician/ physician or gastro/endocrinologist to check the nutritional status and symptoms of any deficiency disease.

The severity of celiac disease symptoms

GSRS (Gastrointestinal symptoms rating scale) will be used to calculate the gastrointestinal symptoms and seriousness of celiac disease (Lohiniemi et al., 2000).

Diet Survey

The information regarding dietary intake and food preferences will be taken by the subjects. A food frequency questionnaire and 24 hours dietary recall will be used to evaluate the calorie intake. This will estimate the average daily nutrient intake of the subjects during the period of one month. Information related to knowledge, attitude, and practices toward disease management will be taken with a reliable questionnaire.

Physical activity and Exercise

The information regarding the daily routine activity and its impact on the normal life of women with celiac disease will be recorded.

Phase II:(Intervention phase) in this phase, Information Education and Communication Material will be developed, and conduct the Nutrition Education Intervention Programme for selected subjects.

Phase III :(Post Intervention) in this phase, the impact of the Nutrition Education Intervention Programme on Clinical symptoms, Nutritional status, Knowledge, Attitude, and Practice of subjects will be assessed from pre to post-test.

Collection of Data:

1. Health screening of patients will be done by visiting in OPD and IPD of different Gastro/Endocrinologist departments in the hospital/clinic setup of Delhi NCR.
2. The women with celiac disease who agree to participate will be requested to provide a written consent letter.
3. Data will be collected using a questionnaire from women with celiac disease.
4. Clinical Symptoms related to the disease, Nutritional status, identification of problems or challenges faced by women with celiac disease, and their Knowledge, Attitudes, and Practices to following a gluten-free diet and management of the disease will be assessed by using a questionnaire.
5. Based on the results following will be developed.

Development of Information Education and Communication Material and conduct Nutrition Education Intervention Programme for Women with Celiac Disease.

- Conduct 3 months face to face classes for subjects about disease and diet management. In class room set up, the following will include:
    1. Evaluate the clinical symptoms, nutritional status, knowledge, attitude, and practices of women with celiac disease towards disease management.
    2. Development of different Information Education and Communication materials like modules, and audio-visual aids, which will include detailed information about the disease and its management.
    3. Session will be conducted to do a detailed discussion about the availability, cost, labelling, nutritional value, and standardization of gluten-free food products in the different market of Delhi NCR.
    4. Educate women about the nutritional value of gluten-free products available in the market.
    5. Educate them on how to control their gastrointestinal symptoms and improve knowledge, attitude, and practices related to disease management.
    6. Counselling will be done to enhance the social, physical, and psychological well-being of subjects

7. Develop a diet plan which includes nutritious and well-balanced home-based products, easily affordable will be easily prepared at home, and are less time-consuming.
8. At the end of programme, the evaluation will be done to assess the health of women by anthropometric and biochemical measurements and the effectiveness of this programme will be evaluated by questionnaires.
9. The collected data will be thoroughly analysed by using the appropriate statistical method (SPSS).

6. EXPECTED OUTCOMES OF THE RESEARCH

First expected outcome of the research will be that Education Intervention Programme will reduce the dependency of the subjects on gluten-free ready-to-eat food products in the market. The research is also help to improve the nutritional, psychological health, and total well-being of the subjects. Finally, this research also enhances the knowledge, attitude, and practices towards the disease management of subjects with celiac disease.

REFERENCES

1. Akbari Namvar, Z., Mahdavi, R., Shirmohammadi, M., &Nikniaz, Z. (2022). The effect of group-based education on gastrointestinal symptoms and quality of life in patients with celiac disease: randomized controlled clinical trial. BMC gastroenterology, 22(1), 18. https://doi.org/10.1186/s12876-022-02096-1
2. Anderson, R. M., & Funnell, M. M. (2005). Patient empowerment: reflections on the challenge of fostering the adoption of a new paradigm. *Patient Education And Counseling*, *57*(2), 153–157. https://doi.org/10.1016/j.pec.2004.05.008
3. Andrén Aronsson, C., Lee, H. S., Hård Af Segerstad, E. M., Uusitalo, U., Yang, J., Koletzko, S., Liu, E., Kurppa, K., Bingley, P. J., Toppari, J., Ziegler, A. G., She, J. X., Hagopian, W. A., Rewers, M., Akolkar, B., Krischer, J. P., Virtanen, S. M., Norris, J. M., Agardh, D., & TEDDY Study Group (2019). Association of Gluten Intake During the First 5 Years of Life With Incidence of Celiac Disease Autoimmunity and Celiac Disease Among Children at Increased Risk. *JAMA*, *322*(6), 514–523. https://doi.org/10.1001/jama.2019.10329
4. Alaedini, A., & Green, P. H. (2005). Narrative review: celiac disease: understanding a complex autoimmune disorder. *Annals of Internal Medicine*, *142*(4), 289-298.
5. Assor, E., Marcon, M. A., Hamilton, N., Fry, M., Cooper, T., & Mahmud, F. H. (2015). Design of a dietary intervention to assess the impact of a gluten-free diet in a population with type 1 Diabetes and Celiac Disease. *BMC Gastroenterology*, *15*(1), 1-10.
6. Bai, D., Brar, P., Holleran, S., Ramakrishnan, R., & Green, P. H. (2005). Effect of gender on the manifestations of celiac disease: evidence for greater malabsorption in men. *Scandinavian Journal of Gastroenterology*, *40*(2), 183-187.
7. Barzegar, F., Rostami-Nejad, M., Shalmani, H. M., Sadeghi, A., &Khani, M. A. (2017). The effect of education on the knowledge of patients with celiac disease. *Gastroenterology and Hepatology from bed to bench*, *10*(Suppl1), S15.
8. Branski, D., &Troncone, R. (1998). Celiac disease: a reappraisal. *The Journal of Pediatrics*, *133*(2), 181-187.
9. Brown, N. K., Guandalini, S., Semrad, C., & Kupfer, S. S. (2019). A clinician's guide to celiac disease HLA genetics. *Official Journal of the American of College Gastroenterology | ACG*, *114* (10), 1587-1592.

10. Castillo, N. E., Vanga, R. R., Theethira, T. G., Rubio-Tapia, A., Murray, J. A., Villafuerte, J., ... & Leffler, D. A. (2015). Prevalence of abnormal liver function tests in celiac disease and the effect of a gluten-free diet in the US population. *American Journal of Gastroenterology*, *110*(8), 1216-1222.
11. Catassi, C., &Cobellis, G. (2007). Coeliac disease epidemiology is alive and kicking, especially in the developing world. *Digestive and Liver Disease*, *39*(10), 908-910.
12. Catassi, C., Fabiani, E., Iacono, G., D'Agate, C., Francavilla, R., Biagi, F. ... & Fasano, A. (2007). A prospective, double-blind, placebo-controlled trial to establish a safe gluten threshold for patients with celiac disease. *The American Journal of Clinical Nutrition*, *85*(1), 160-166.
13. Catassi, C., Kryszak, D., Bhatti, B., Sturgeon, C., Helzlsouer, K., Clipp, S. L., & Fasano, A. (2010). Natural history of celiac disease autoimmunity in a USA cohort followed since 1974. *Annals of Medicine*, *42*(7), 530-538.
14. Choi, J. M., Lebwohl, B., Wang, J., Lee, S. K., Murray, J. A., Sauer, M. V., & Green, P. H. (2011). Increased prevalence of celiac disease in patients with unexplained infertility in the United States: a prospective study. *The Journal of Reproductive Medicine*, *56*(5-6), 199.
15. Ciacci, C., Cirillo, M., Sollazzo, R., Savino, G., Sabbatini, F., &Mazzacca, G. (1995). Gender and clinical presentation in adult celiac disease. *Scandinavian Journal of Gstroenterology*, *30*(11), 1077-1081.
16. Collin, P., Vilppula, A., Luostarinen, L., Holmes, G. K. T., & Kaukinen, K. (2018). coeliac disease in later life must not be missed. *Alimentary Pharmacology & Therapeutics*, *47*(5), 563-572.
17. Cooper, B. T., Holmes, G. K., & Cooke, W. T. (1978). Coeliac disease and immunological disorders. *Br Med J*, *1*(6112), 537-539.
18. Cranney, A., Rostom, A., Sy, R., Dubé, C., Saloogee, N., Garritty, C., ... & MacNeil, J. (2005). Consequences of testing for celiac disease. *Gastroenterology*, *128*(4), S109-S120.
19. Denial, W. W. (1999). Biostatics: A Foundation for Analysis in the Health Sciences. (7th ed.). John Wiley & Sons.
20. Dewar, D. H., &Ciclitira, P. J. (2005). Clinical features and diagnosis of celiac disease. *Gastroenterology*, *128*(4), S19-S24.

21. Dieterich, W., Ehnis, T., Bauer, M., Donner, P., Volta, U., Riecken, E. O., &Schuppan, D. (1997). Identification of tissue transglutaminase as the autoantigen of celiac disease. *Nature Medicine*, *3*(7), 797-801.
22. Dowd, A. J., Kronlund, L., Parmar, C., Daun, J. T., Wytsma-Fisher, K., Reimer, R. A. ... &Culos-Reed, S. N. (2019). A 12-week pilot exercise program for inactive adults with celiac disease: study protocol. *Global Advances in Health and Medicine*, *8*, 2164956119853777.
23. Ehsani-Ardakani, M. J., Rostami Nejad, M., Villanacci, V., Volta, U., Manenti, S., Caio, G., Giovenali, P., Becheanu, G., Diculescu, M., Pellegrino, S., Magazzù, G., Casella, G., Di Bella, C., Decarli, N., Biancalani, M., Bassotti, G., Hogg-Kollars, S., Zali, M. R., & Rostami, K. (2013). Gastrointestinal and non-gastrointestinal presentation in patients with celiac disease. *Archives of Iranian Medicine*, *16*(2), 78–82.
24. Farthing, M. J. G., REES, L. H., & Dawson, A. M. (1983). Male gonadal function in coeliac disease: III. Pituitary regulation. *Clinical Endocrinology*, *19*(6), 661-671.
25. Farthing, M. J., Rees, L. H., Edwards, C. R., & Dawson, A. M. (1983). Male gonadal function in coeliac disease: 2. Sex hormones. *Gut*, *24*(2), 127-135.
26. Fasano, A., Araya, M., Bhatnagar, S., Cameron, D., Catassi, C., Dirks, M. ... & Phillips, A. (2008). Federation of International Societies of Pediatric Gastroenterology, Hepatology, and Nutrition consensus report on celiac disease. *Journal of Pediatric Gastroenterology and Nutrition*, *47* (2), 214-219.
27. García-Manzanares, Á., &Lucendo, A. J. (2011). Nutritional and dietary aspects of celiac disease. *Nutrition in Clinical Practice*, *26*(2), 163-173.
28. Green, P. H., &Cellier, C. (2007). Celiac disease. *New England Journal Of Medicine*, *357*(17), 1731-1743.
29. Green, P. H., & Jabri, B. (2003). Coeliac disease. *The Lancet*, *362*(9381), 383-391.
30. Guandalini, S., Ventura, A., Ansaldi, N., Giunta, A. M., Greco, L., Lazzari, R., ... &Rubino, A. (1989). Diagnosis of coeliac disease: time for a change?. *Archives of Disease in Childhood*, *64*(9), 1320.

31. Guidetti, C. S., Solerio, E., Scaglione, N., Aimo, G., &Mengozzi, G. (2001). Duration of gluten exposure in adult coeliac disease does not correlate with the risk for autoimmune disorders. *Gut*, *49*(4), 502-505.
32. Haas, K., Martin, A., & Park, K. T. (2017). Text message intervention (TEACH) improves quality of life and patient activation in celiac disease: a randomized clinical trial. *The Journal of Pediatrics*, *185*, 62-67.
33. Hill, I. D., Dirks, M. H., Liptak, G. S., Colletti, R. B., Fasano, A., Guandalini, S., & Seidman, E. G. (2005). Guideline for the diagnosis and treatment of celiac disease in children: recommendations of the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition. *Journal of Pediatric Gastroenterology and Nutrition*, *40*(1), 1-19.
34. Harewood, G. C., & Murray, J. A. (2001). Diagnostic approach to a patient with suspected celiac disease: a cost analysis. *Digestive Diseases and Sciences*, *46* (11), 2510-2514.
35. Izadirad, H., Masoudi, G.R., & Zareban,I.(2014). Evaluation of efficacy of education program based on BASNEF model on Self-care behaviors of women with hypertension.
36. Jacobsson, L. R., Friedrichsen, M., Göransson, A., &Hallert, C. (2012). Impact of an active patient education program on gastrointestinal symptoms in women with celiac disease following a gluten-free diet: a randomized controlled trial. *Gastroenterology Nursing*, *35*(3), 200-206.
37. Jacobson, D. L., Gange, S. J., Rose, N. R., & Graham, N. M. (1997). Epidemiology and estimated population burden of selected autoimmune diseases in the United States. *Clinical Immunology and Immunopathology*, *84*(3), 223-243.
38. Jansson-Knodell, C. L., Hujoel, I. A., West, C. P., Taneja, V., Prokop, L. J., Rubio-Tapia, A., & Murray, J. A. (2019). Sex difference in celiac disease in undiagnosed populations: a systematic review and meta-analysis. *Clinical Gastroenterology and Hepatology*, *17*(10), 1954-1968.
39. Jyoti, Sangwan, V. ., & Rani, V. (2022). Effect of Nutrition Interventions on Knowledge and Adoption Feasibility of Gluten Free Products by Celiac Disease Patients. Indian Journal of Extension Education, 58(3), 179–181. https:// doi.org /10 .48165/ IJEE.2022.58336

40. Katz, K. D., Rashtak, S., Lahr, B. D., Melton III, L. J., Krause, P. K., Maggi, K., ... & Murray, J. A. (2011). Screening for celiac disease in a North American population: sequential serology and gastrointestinal symptoms. *The American Journal of Gastroenterology*, *106*(7), 1333.
41. King, J. A., Jeong, J., Underwood, F. E., Quan, J., Panaccione, N., Windsor, J. W.,& Kaplan, G. G. (2020). Incidence of celiac disease is increasing over time: a systematic review and meta-analysis. *American Journal of Gastroenterology*, *115*(4), 507-525.
42. Kuja-Halkola, R., Lebwohl, B., Halfvarson, J., Emilsson, L., Magnusson, P. K., &Ludvigsson, J. F. (2017). Birth weight, sex, and celiac disease: a nationwide twin study. *Clinical Epidemiology*, *9*, 567.
43. Lasa, A., Larretxi, I., Simón, E., Churruca, I., Navarro, V., Martínez, O. & Miranda, J. (2019). New software for gluten-free diet evaluation and nutritional education. *Nutrients*, *11*(10), 2505.
44. Lanzini, A., Lanzarotto, F., Villanacci, V., Mora, A., Bertolazzi, S., Turini, D., Carella, G., Malagoli, A., Ferrante, G., Cesana, B. M., & Ricci, C. (2009). Complete recovery of intestinal mucosa occurs very rarely in adult coeliac patients despite adherence to gluten-free diet. *Alimentary Pharmacology & Therapeutics*, *29*(12), 1299–1308. https://doi.org/10.1111/j.1365-2036.2009.03992.x
45. Lebwohl, B., Tennyson, C. A., Holub, J. L., Lieberman, D. A., Neugut, A. I., & Green, P. H. (2012). Sex and racial disparities in duodenal biopsy to evaluate for celiac disease. *Gastrointestinal Endoscopy*, *76*(4), 779-785.
46. Lebwohl, B., Roy, A., Alaedini, A., Green, P. H., &Ludvigsson, J. F. (2016). Risk of headache-related healthcare visits in patients with celiac disease: A population-based observational study. *Headache: The Journal of Head and Face Pain*, *56*(5), 849-858.
47. Little, J. C., Hester, E. T., & Carey, C. C. (2016). Assessing and Enhancing Environmental Sustainability: A Conceptual Review. *Environmental Science & Technology*, *50*(13), 6830–6845. https://doi.org/10.1021/acs.est.6b00298
48. Liu, E., Lee, H. S., Aronsson, C. A., Hagopian, W. A., Koletzko, S., Rewers, M. J., ... & Agardh, D. (2014). Risk of pediatric celiac disease according to HLA haplotype and country. *New England Journal of Medicine*, *371*(1), 42-49.
49. Liu, E., Dong, F., Barón, A. E., Taki, I., Norris, J. M., Frohnert, B. I., &Rewers, M. (2017). High incidence of celiac disease in a long-term study of adolescents with susceptibility genotypes. *Gastroenterology*, *152*(6), 1329-1336.

50. Lohiniemi, S., Mäki, M., Kaukinen, K., Laippala, P., & Collin, P. (2000). Gastrointestinal symptoms rating scale in coeliac disease patients on wheat starch-based gluten-free diets. *Scandinavian Journal of Gastroenterology*, *35*(9), 94
51. 7-949.
52. Lohi, S., Mustalahti, K., Kaukinen, K., Laurila, K., Collin, P., Rissanen, H.,&Mäki, M. (2007). Increasing prevalence of coeliac disease over time. *Alimentary Pharmacology & Therapeutics*, *26*(9), 1217-1225.
53. Lundin, K. E., Gjertsen, H. A., Scott, H., Sollid, L. M., & Thorsby, E. (1994). Function of DQ2 and DQ8 as HLA susceptibility molecules in celiac disease. *Human Immunology*, *41*(1), 24-27.
54. Mahmud, F. H., De Melo, E. N., Noordin, K., Assor, E., Sahota, K., Davies-Shaw, J., & Marcon, M. A. (2015). The Celiac Disease and Diabetes-Dietary Intervention and Evaluation Trial (CD-DIET) protocol: a randomised controlled study to evaluate treatment of asymptomatic coeliac disease in type 1 diabetes. *BMJ open*, *5*(5), e008097.
55. Makharia, G. K., Verma, A. K., Amarchand, R., Bhatnagar, S., Das, P., Goswami, A., Bhatia, V., Ahuja, V., Datta Gupta, S., & Anand, K. (2011). Prevalence of celiac disease in the northern part of India: a community based study. *Journal of Gastroenterology and Hepatology*, *26*(5), 894–900. https://doi.org/10.1111/j.1440-1746.2010.06606.x
56. Mehtab, W., Sachdev, V., Malhotra, A., Singh, N., &Makharia, G. K. (2018, November). Comparative analysis of cost and nutritional composition of gluten-free food with their gluten containing counterparts. In *Journal of Gastroenterology and Hepatology* (vol. 33, pp. 551-551). 111 river st, hoboken 07030-5774, nj usa: wiley.
57. Mehtab, W., Sachdev, V., Singh, A., Agarwal, S., Singh, N., Malik, R. & Makharia, G. (2021). Gluten content in labeled and unlabeled gluten-free food products used by patients with celiac disease. *European Journal of Clinical Nutrition*, 1-9.
58. Muhammad, H., Reeves, S., & Jeanes, Y. M. (2019). Identifying and improving adherence to the gluten-free diet in people with coeliac disease. *Proceedings of the Nutrition Society*, *78*(3), 418-425.
59. Muhammad, H., Reeves, S., Ishaq, S., Mayberry, J. F., & Jeanes, Y. M. (2020). Telephone clinic improves gluten-free dietary adherence in adults with coeliac disease: sustained at 6 months. Frontline *Gastroenterology*, 12(7), 586–592. https:// doi .org/ 10 .1136/flgastro-2020-101643

60. Narayan S, Mittal SK (2014). Celiac Disease a guide for families, celiac support organizations. Wheat free, Disease free. Web www. Celiac support organization .org .”n.d.”
61. Barzegar, F., Rostami-Nejad, M., Mohaghegh Shalmani, H., Sadeghi, A., Allahverdi Khani, M., & Aldulaimi, D. (2017). The effect of education on the knowledge of patients with celiac disease. *Gastroenterology and Hepatology from Bed to Bench*, *10*(Suppl1), S15–S19.
62. Rostami Nejad, M., Rostami, K., Emami, M., Zali, M., & Malekzadeh, R. (2011). Epidemiology of celiac disease in iran: a review. *Middle East Journal of Digestive Diseases*, *3*(1), 5–12.
63. NIH Consensus Development Panel.NIH, Consensus development conferences on celiac disease. Retrieved on April 26,(2010) ,from http:// consensus.nih .gov/ 2004 /2004 celiac disease118html.htm.
64. Nisticò, L., Fagnani, C., Coto, I., Percopo, S., Cotichini, R., Limongelli, M. G., &Stazi, M. A. (2006). Concordance, disease progression, and heritability of coeliac disease in Italian twins. *Gut*, *55*(6), 803-808.
65. Rubio–Tapia, A., Kyle, R. A., Kaplan, E. L., Johnson, D. R., Page, W., Erdtmann, F., & Murray, J. A. (2009). Increased prevalence and mortality in undiagnosed celiac disease. *Gastroenterology*, *137*(1), 88-93.
66. Sainsbury, K., Mullan, B., & Sharpe, L. (2013). A randomized controlled trial of an online intervention to improve gluten-free diet adherence in celiac disease. *American Journal of Gastroenterology*, *108*(5), 811-817.
67. Sainsbury, K., Mullan, B., & Sharpe, L. (2015). Dissemination of an online theory-based intervention to improve gluten-free diet adherence in coeliac disease: the relationship between acceptability, effectiveness, and attrition. *International journal of behavioral medicine*, *22*(3), 356-364.
68. Shah, V. H., Rotterdam, H., Kotler, D. P., Fasano, A., & Green, P. H. (2000). All that scallops is not celiac disease. *Gastrointestinal Endoscopy*, *51*(6), 717-720.
69. Ventura, A., Magazzù, G., & Greco, L. (1999). Duration of exposure to gluten and risk for autoimmune disorders in patients with celiac disease. *Gastroenterology*, *117*(2), 297-303.
70. Wolf, R. L., Morawetz, M., Lee, A. R., Koch, P., Contento, I. R., Zybert, P., &Lebwohl, B. (2019). A Cooking-Based Intervention Promotes Gluten-Free Diet

Adherence and Quality of Life for Adults with Celiac Disease. *Clinical Gastroenterology and Hepatology: the Official Clinical Practice Journal of the American Gastroenterological Association*.

71. Zingone, F., Swift, G. L., Card, T. R., Sanders, D. S., Ludvigsson, J. F., & Bai, J. C. (2015). Psychological morbidity of celiac disease: A review of the literature. *United European Gastroenterology Journal*, *3*(2), 136-145.

EFFECT OF NUTRITION EDUCATION INTERVENTION PROGRAMME ON KNOWLEDGE, ATTITUDE, AND PRACTICES OF WOMEN SUFFERING FROM CELIAC DISEASE

SHORT SYNOPSIS

by

Saloni Sharma

Registration number: 18/PhD/003

Under the supervision of

Dr. Pratibha Singh

Professor

Faculty of Allied Health Sciences

FACULTY OF ALLIED HEALTH SCIENCES

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES SECTOR-43, SURAJKUND –DELHI ROAD, FARIDABAD – 121001

ABSTRACT

Celiac disease occurs due to an allergic reaction to gluten a protein present in cereals. In India, it is highly prevalent in the north, northwestern, and central parts of the country. In these areas, the widespread presence of celiac disease is found in approximately 1% of the Indian populace. It is estimated that around 1.5 lacks to 2.0 lakh people are suffering from this disease in Delhi and NCR area. The aim of the study is to understand and find ways to enhance the nutritional, physical, social, and psychological wellness of women (age group between 18 to 39 years) who are suffering from CD. The Nutrition Education Intervention Programme has been conducted and developed Information Education and Communication Material to educate and enhance Knowledge,

Attitude, and Practices toward disease management of women with CD to maintain their nutritional status and overall well-being. There will be 138 celiac females age group ranging from 18 to 39 years who will be selected from the gastro/endocrinological Clinic and hospital situated in Delhi NCR. Three months of classes will be conducted for one hour and continue the session every Sunday for a week. Different modules, diet plans, and audio-visual tools will be used to educate and create awareness among the subjects regarding disease management. The effectiveness of this programme will be assessed by pre to post-test. The quantitative data will be analysed by using the Pearson correlation method, qualitative data will be used to analyse by the chi-square method by using SPSS version 20 software.

Key Words: Celiac Disease, Gluten, Endocrinology, Nutritional Education Intervention Programme, Information Education and Communication Material Health Status, Audio-Visual Aids, Modules.

MANAV RACHNA
Vidyanatariksha

Dr. O.P. Bhalla Central Library
Manav Rachna International Institute of Research and Studies
(A deemed-to-be-university under section 3 of UGC Act 1956)

SIMILARITY VERIFICATION CERTIFICATE

Title: "EFFECT OF NUTRITION EDUCATION INTERVENTION PROGRAMME ON KNOWLEDGE, ATTITUDE AND PRACTICES OF WOMEN SUFFERING FROM CELIAC DISEASE."

Researcher: Sulakshana

Registration Number: 18/Ph.D/903

Supervisor: Dr. Pratibha Singh

Department: Nutrition and Dietetics (FAHS)

This is to certify that the above mentioned Short Synopsis/Thesis was scanned for similarity index through Turnitin Software on 23/01/2023 with submission ID 1997608710 and the similarity index was found to be 9 %. The complete report running into 33 Pages, 9049 Word count with File Size 4504 KB is being forwarded to the Research Supervisor/DRC/DRB for review.

Date: 23/01/2023

Rajesh Kumar 23/1/23
Dr. Rajesh Kumar
University Librarian
Dr. O.P. Bhalla Central Library
Manav Rachna International
Institute of Research & Studies
Faridabad

The complete report of the above Short Synopsis/Thesis has been reviewed and the similarity index is below the accepted norms as per the University Grants Commission (Promotion of Academic Integrity and Prevention of Plagiarism in Higher Educational Institutions) Regulations 2018. The Short Synopsis/Thesis may be considered for further processing

Sulakshana
Research Scholar
23/01/2023

23/01/2023
Research Supervisor

EFFECT OF NUTRITION EDUCATION INTERVENTION PROGRAMME ON KNOWLEDGE, ATTITUDE, AND PRACTICES OF WOMEN SUFFERING FROM CELIAC DISEASE

ORIGINALITY REPORT

Dr. Rajesh Kumar 23/1/23
University Librarian
Dr. O.P. Bhalla Central Library
Manav Rachna International
Institute of Research & Studies
Faridabad

9%	8%	10%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

Excluding matches less than 10 words

PRIMARY SOURCES

1	Benjamin Lebwohl, Alberto Rubio-Tapia. "Epidemiology, Presentation, and Diagnosis of Celiac Disease", Gastroenterology, 2021 Publication	1%
2	Benjamin Lebwohl, Alberto Rubio-Tapia. "Epidemiology, Presentation, and Diagnosis of Celiac Disease", Gastroenterology, 2020 Publication	1%
3	bmcgastroenterol.biomedcentral.com Internet Source	1%
4	Diane Bai, Pardeep Brar, Steve Holleran, Rajasekhar Ramakrishnan, Peter H. R. Green. "Effect of gender on the manifestations of celiac disease: Evidence for greater malabsorption in men", Scandinavian Journal of Gastroenterology, 2009 Publication	<1%
5	core.ac.uk Internet Source	<1%

6	shodhgangotri.inflibnet.ac.in Internet Source	<1 %
7	Buzby, M.. "Celiac Disease: The Endocrine Connection", Journal of Pediatric Nursing, 201008 Publication	<1 %
8	pubmed.ncbi.nlm.nih.gov Internet Source	<1 %
9	Paul J Ciclitira. "Celiac disease in the elderly", Nature Clinical Practice Gastroenterology & Hepatology, 10/21/2008 Publication	<1 %
10	www.science.gov Internet Source	<1 %
11	pure.roehampton.ac.uk Internet Source	<1 %
12	res.mdpi.com Internet Source	<1 %
13	play.google.com Internet Source	<1 %
14	ptdocz.com Internet Source	<1 %
15	sciencescholar.us Internet Source	<1 %
	www.sid.ir	

16	Internet Source	<1 %
17	"Advances in Celiac Disease", Springer Science and Business Media LLC, 2022 Publication	<1 %
18	"Advances in the Understanding of Gluten related Pathology and the Evolution of Gluten-Free Foods", Omnia Publisher SL, 2015 Publication	<1 %
19	Zahra Akbari Namvar, Reza Mahdavi, Masood Shirmohammadi, Zeinab Nikniaz. "The effect of group-based education on gastrointestinal symptoms and quality of life in patients with celiac disease: randomized controlled clinical trial", BMC Gastroenterology, 2022 Publication	<1 %
20	sites.kowsarpub.com Internet Source	<1 %
21	www.ncbi.nlm.nih.gov Internet Source	<1 %
22	Clinical Gastroenterology, 2014. Publication	<1 %
23	www.open-access.bcu.ac.uk Internet Source	<1 %
24	F. H. Mahmud, E. N. De Melo, K. Noordin, E. Assor et al. "The Celiac Disease and Diabetes-	<1 %

Dietary Intervention and Evaluation Trial (CD-DIET) protocol: a randomised controlled study to evaluate treatment of asymptomatic coeliac disease in type 1 diabetes", BMJ Open, 2015
Publication

25	Submitted to University of Warwick Student Paper	<1 %
26	acspublisher.com Internet Source	<1 %

Exclude quotes	On	Exclude matches	< 14 words
Exclude bibliography	On		